

U.S. Patent Application Serial No. 09/884,998
Response filed July 9, 2007
Reply to OA dated April 4, 2007

REMARKS

The applicants submit that no new matter has been added. It is believed that this Response is fully responsive to the Office Action dated April 4, 2007.

Claims 25 - 33 are currently pending in this patent application, claims 25 and 30 being independent claims

The Terminal Disclaimer with regard to co-pending Application Serial No. 11/367,432, filed December 27, 2006, has been acknowledged by the Examiner.

Claims 25 - 33 are rejected under 35 USC §112, first paragraph. More particularly, the Examiner refers to the expression in claims 25 and 30 alleging that "intermediate layers formed between said soft layer and each said quench hardened layer" is not supported by the applicants' specification as originally filed. The applicants respectfully request reconsideration of this rejection.

In order to overcome this rejection, the applicants submit that it is known in the art to have intermediate layers formed between various material structures in a workpiece, as heating and cooling of an interior of a workpiece, because of heat transfer rates, cannot be stopped at sharp

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boundaries in the workpiece. Examples of these intermediate layers are found in Girardello's Figure 3 and Figure 8.

Also, Vickers hardness graphs in the present application give evidence of the intermediate layers as the hardness does not change in a cliff-like manner. Also, in Girardello in claim 5, external and internal regions are defined, a core region is defined, and two intermediate regions are defined. For the above reasons, the applicants traverse the Examiner's outstanding 35 USC §112, first paragraph, rejection.

In view of the above, the withdrawal of the outstanding 35 USC §112, first paragraph, rejection is in order, and is therefore respectfully solicited.

As to the merits of this case, the following rejections are set forth: (1) claims 25, 26, 28 and 29 are rejected under 35 USC §103(a) based on Girardello; and (2) claims 27 and 30 - 33 are rejected under 35 USC §103(a) based on Girardello in view of JP 401272719. The lengthy details of the rejection are found on pages 3 - 5 of the Office Action; and are thus not repeated here.

The applicants respectfully request reconsideration of these rejections.

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In a "Response to Arguments" portion of the Office Action, on page 5, the Examiner states that the applicants' arguments filed December 27, 2006 have been fully considered but they are not persuasive. Applicants argue that a distinction between the claimed invention and the cited references is highlighted in the showing of a distinction between the claimed "soft layer" of the present core region and the corresponding core region of Girardello.

In Girardello's bushing, which is shown in its finished condition in Fig. 8, a core region of the bushing is made up of sorbite. But, instant claimed "soft layers" do not exclude martensite, as the Examiner refers to original claims 25 and 30, which recites cooling the structure between said quench hardened layers being composed of one or more structures selected from ferrite, pearlite, bainite and martensite which are precipitated during cooling from the quenching temperature, said bushing being low temperature tempered.

The Examiner further argues that Girardello in col. 3, lines 65 - 67 discloses "[t]wo regions having a mixed structure (ferrite, bainite, pearlite) form between the outer regions and the core of the bushing: the presence of a sorbitic structure in the core" and the regions between the outer regions and the core of Girardello read on the claimed "soft layers." The Examiner mentions that the applicants argue that "[i]n the present invention, martensite is never formed in the core region." But the Examiner refers again to the original claims 25 and 30, discussed above. The Examiner also mentions that the applicants' argument on page 11 of the instant remarks is noted, but, there is no

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“intermediate layers” defined or disclosed in the specification as originally filed.

The applicants submit that the Examiner is, improperly, not considering solely the soft layer formed in the core, which does not include the intermediate layers, as being what distinguishes the applicants’ present claimed invention over the teachings of Girardello.

As discussed above under the 35 USC §112 rejection, the applicants’ arguments should convince the Examiner that it is known in the art that intermediate layers are always present in a workpiece (such as, a bushing), and that the material structure in those intermediate layers are mixed.

In Girardello, a core is clearly shown in Fig. 8 as being sorbite. The sorbite is formed by tempering the martensite that was previously at the core location which is shown in Fig. 6 as that is the definition of sorbite. There should be no question that the “core” of Girardello is composed of sorbite.

In the applicants’ presently claimed invention, although no drawing is shown having the core portion and the intermediate portions, it is known in the art that such portions exist in a workpiece like a bushing. It can be argued that the present core cannot be sorbite, as in Girardello, because the present “core” was never martensite during any of heat treatment steps. This is disclosed at page 53, lines 4 - 7 where the following is recited: “thanks to this advance cooling from the inner

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circumferential surface, the temperature of the bushing at the center in its cross section decreases to such a temperature range in which hardening does not occur, and as a result, an imperfectly hardened layer is created inside the wall of the bushing.” In the present application, the wording “hardening does not occur” and “imperfectly hardened” means martensite is not formed. This understanding is known in the art.

In view of the above remarks, the core of the present claimed invention must be distinct from the core disclosed in Girardello.

The present disclosure mentioned above by the Examiner (that martensite is “between said quench hardened layers”) refers to the core and the two intermediate layers. It is not presently disclosed that martensite is found in the core portion.

In view of the above, the withdrawal of the outstanding obviousness rejections under 35 USC §103(a) is in order, and is therefore respectfully solicited.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants’ undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

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In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper to Deposit Account No. 01-2340.

Respectfully submitted,

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Enclosures: Petition for Extension of Time